epidemiology of the specific disease, the adoption and diffusion rate of new drug, etc. Drug cost is expressed as the monthly cost of new and/or existing drugs. Treatment duration is the average months of patient remained on new and/or existing drugs which could be derived from clinical trials or clinical observations. Person-time on treatment is calculated by multiplying (1) and (2) and be allocated to respective budget year, then multiple (3) to obtain the annual cost of new and/or existing treatment. The net financial impact is the annual cost difference between new and existing treatment. **CONCLUSIONS:** The framework is simple and flexible, feasible for most new drug applications to estimate likely financial impact. It has been adopted by recently revised new drug reimbursement application form of NHI. The working tool is freely available as an option for calculation.

ME4

DEVELOPMENT OF STANDARD COST LIST FOR ECONOMIC EVALUATION IN THAILAND

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OBJECTIVES: The objectives of this study were to develop the relative value units (RVUs) and unit costs of hospital health services employing the RVU method for economic evaluation in Thailand. **METHODS:** The RVUs were developed by using the objective data method based on the reimbursable price list of the Civil Service Medical Benefit Scheme. For non-reimbursable health promotion and prevention services, unit costs were calculated at a selected hospital for RVU development. To test the RVUs, the unit costs calculated by RVU method were compared to those computed by conventional micro-costing method. Then, the RVUs were used to calculate standard unit costs of health services. Three district hospitals and three provincial hospitals where met the developed efficiency criteria were selected for the calculation. Total hospital cost including labor, material and capital costs and excluding pharmacy cost was calculated. Total RVUs were calculated by the summation of the multiplication of number of health services provided and its RVU. Total cost was divided by the total RVUs resulting in cost per RVU. Finally, unit cost of each service was calculated by the multiplication of number of RVUs and cost per RVU. **RESULTS:** This study results in RVUs of 3091 health service items which were classified into 12 groups. Unit cost of each service classified by types of hospitals was provided. A web-based standard unit cost list was created and could be accessible to the public. **CONCLUSIONS:** This study developed the first list of standard unit cost of health services of district and provincial hospitals in Thailand. The standard unit cost list is an important tool for providing cost inputs when performing economic evaluation of health interventions and it helps standardize and improve the quality of economic evaluation studies in Thailand.

PODIUM SESSION II: CARDIOVASCULAR DISEASE STUDIES

CV1

USING REAL WORLD DATA TO CALCULATE THE COST-EFFECTIVENESS OF STATIN AMONG PARTICIPNATS WITH ATHEROTHROMBOTIC DISEASE IN AUSTRALIAN GENERAL PRACTICE

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OBJECTIVES: The use of statin has been shown to be cost effective in the secondary prevention of coronary heart disease and cerebrovascular disease. However, a "treatment gap" exists, whereby many eligible patients do not receive statin therapy. We sought to determine the cost-effectiveness of closing this treatment gap in the Australian healthcare setting. **METHODS:** Analysis was based on 4-year follow-up data from Australian participants of the Reduction of Atherothrombosis for Continued Health (REACH) Registry. Subjects were aged ³45 years and had established atherothrombotic disease, comprising coronary artery disease (CAD), and cerebrovascular (CerVD) disease. Decision analysis was applied to compare current coverage with statin against a hypothetical situation whereby all subjects were assumed to be treated. Outcomes of interest were nonfatal stroke, nonfatal myocardial infraction (MI), and cardiovascular deaths. The relative changes to the risks of these outcomes conferred by statin were derived from published meta-analysis. Costs were based on government-reimbursed data for 2009. **RESULTS:** Among the sample of 2768 participants, coverage with statin therapy was between 63% and 82%, depending on age group. Over the 4-year period, 89, 101, and 146 nonfatal strokes, nonfatal MIs, and cardiovascular deaths were observed, respectively. Assuming that all subjects had taken statin, the predicted equivalent numbers were 85, 96, and 137 respectively. The estimated incremental cost-effectiveness ratio (ICER) for CAD subjects was AUD $45,274 per life-year gained (LYG). For CerVD subjects, the ICERs were AUD $40,738. Equating to numbers needed to treat of 136 and 99.5. Sensitivity analysis showed that the results were robust. **CONCLUSIONS:** The results of this model suggest that for subjects with athethrombotic disease, maximizing coverage with statin, in line with evidence-based recommendations, represents a cost-effective means of secondary prevention.

CV2

ATTRIBUTABLE COST AND LENGTH OF STAY FOR PATIENTS WITH ENOXAPARIN-ASSOCIATED BLEEDING

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OBJECTIVES: Patients receiving enoxaparin are at risk of bleeding. However, the study of the financial impact of enoxaparin-associated bleeding is limited. This study aims to estimate the attributable costs and length of stay (LOS) of patients with enoxaparin-associated bleeding (EAB) compared with non-bleeding patients (NB). **METHODS:** We conducted a retrospective cohort study of hospitalized acute coronary syndrome patients who received enoxaparin since January 2006 to February 2009 in a large University-affiliated hospital. Cost and LOS were compared between patients with and without EAB on both univariable and multivariable analyses. In multivariable analysis, the attributable cost and LOS were estimated using a multiple linear regression with log-transformed model and adjusted by propensity score (PS), which was predicted by patient' characteristics including age, gender, history of bleeding, hypertension, stroke, diabetes, creatinine clearance, and congestive heart failure (CHF) at admission. The adjusted means of cost and LOS estimates were retransformed to their natural values using Duan's smearing estimator. The differences of costs and LOS were presented as mean with 95% confidence intervals. **RESULTS:** Out of 346 patients, 134 (38.7%) experienced enoxaparin-associated bleeding. The average age and comorbidities in both groups were similar. However, in EAB group had more male than NB group (42% vs. 30%). Based on univariable analyses, the attributable cost and LOS of patients with EAB were 68,875 THB ($2152) and 4.2 days, respectively. Based on PS-adjusted multivariable regression analyses, the cost and LOS attributable to EAB was 80,644 THB ($2520) (95% CI: 69,879 ($2184) to 91,408 ($2857) and 3.4 days (95% CI: 3.0 to 3.7), respectively. **CONCLUSIONS:** Bleeding is associated with increased cost and LOS among enoxaparin users. These findings suggest that strategies that reduce the risk of bleeding have the potential important reductions in costs of care for enoxaparin users.

CV3

COST-EFFECTIVENESS OF RIVAROXABAN VERSUS ENOXAPARIN FOR PREVENTION OF VENOUS THROMBOEMBOLISM (VTE) AFTER TOTAL KNEE REPLACEMENT (TKR) IN CHINA

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OBJECTIVES: To evaluate the cost-effectiveness of rivaroxaban against enoxaparin for prevention of venous thromboembolism (VTE) following total knee replacement (TKR) in China. **METHODS:** An economic model was developed, consisting of three modules: prophylaxis, post-prophylaxis, and long-term complications. The first two modules were represented using a decision tree while the third module used a Markov process. Safety and efficacy data during prophylaxis were derived from a Phase III international multi-regional registration trail (RECORD 3). Utility outcomes and the probability of long-term events were based on systematic review and published data. Resource use related to VTE prevention, treatment and complications was based on clinical guidelines, product labels, and interviews conducted in six Tier 3 hospitals in Beijing, Shanghai and Guangzhou City. Unit cost data were collected from government pricing bureau and presented in 2009 CNY from the health-care system perspective. Costs and outcomes were discounted at 3% per annum. Extensive one-way probabilistic sensitivity analyses were undertaken. **RESULTS:** In the base case analyses, rivaroxaban was shown to be dominant compared with enoxaparin. Rivaroxaban was associated with 0.0019 additional QALYs per patient while saving an average of CNY 242 per patient over 5 years. Costs associated with VTE clinical events were lower in rivaroxaban group (CNY 581) compared with the enoxaparin group (CNY 1059). Probabilistic sensitivity analyses estimated that rivaroxaban had a probability of >90% of being cost-effective compared with enoxaparin at a low willingness-to-pay threshold of CNY 20,000 per QALY gained. **CONCLUSIONS:** Compared with enoxaparin, rivaroxaban improved patients' health outcomes and produced overall cost savings in VTE prevention after TKR in China.

CV4

THE CLINICAL EFFECTIVENESS OF 64-SLICE OR HIGHER COMPUTED TOMOGRAPHY ANGIOGRAPHY AS AN ALTERNATIVE TO INVASIVE CORONARY ANGIOGRAPHY IN THE INVESTIGATION OF SUSPECTED CORONARY ARTERY DISEASE

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OBJECTIVES: This systematic review was conducted for The New Zealand Ministry of Health to summarize recent evidence pertaining to the clinical effectiveness of 64-slice or higher computed tomography angiography (CTA) in patients with suspected coronary artery disease (CAD). If CTA proves to be a successful diagnostic performance measure, it could prevent the application of invasive diagnostic procedures in some patients. This would provide multiple health and cost benefits, particularly for under resourced District Health Boards where invasive coronary angiography is not always available. **METHODS:** A systematic method of literature searching and selection was employed with searches limited to December 2006 to March 2009. Included studies were quality assessed using NHMRC diagnostic levels of evidence and a modified QUADAS tool. Individual and pooled diagnostic performance measures (i.e., sensitivity, specificity, positive predictive value (PPV), negative predictive

value (NPV) and overall diagnostic accuracy) were calculated at the patient, vessel and segment level. **RESULTS:** This systematic review included 28 studies. The base case meta-analysis at the patient-level indicated a sensitivity of 98.2%, specificity of 81.6%, PPV of 88.9%, NPV of 96.8%, and diagnostic accuracy of 91.6%. In all vessels, the pooled sensitivity was 95.0%, specificity 85.2%, PPV 69.4%, NPV 97.9%, and diagnostic accuracy 87.7%. At the individual artery level, overall diagnostic accuracy appeared to be slightly higher in the left and right coronary artery and slightly lower in the left anterior descending and circumflex artery. In all segments, the sensitivity was 91.1%, specificity 94.3%, PPV 65.7%, NPV 98.9%, and overall diagnostic accuracy 94.0%. **CONCLUSIONS:** The high sensitivity observed in this update indicates that CTA can effectively identify the majority of patients with significant coronary artery stenosis. The high NPV at the patient, vessel and segment level establishes CTA as an effective noninvasive alternative to ICA for the exclusion of stenosis.

PODIUM SESSION II: DIABETES STUDIES

DB1

EVALUATING THE COST-EFFECTIVENESS OF THERAPY CONVERSION FROM BASAL INSULIN TO BIPHASIC INSULIN ASPART 30/70 IN PATIENTS WITH TYPE 2 DIABETES IN CHINA: A MODELING STUDY OF LONG-TERM COSTS AND HEALTH OUTCOMES

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OBJECTIVES: To evaluate the long-term cost-effectiveness of switching from basal insulin to biphasic insulin aspart 30 (BIAsp30) in patients with type 2 diabetes (T2D) in China. **METHODS:** A published and validated computer simulation model of diabetes (CORE Diabetes Model) was used to project long-term (30 years) of health and economic outcomes. Simulated cohorts and treatment effects were derived from a 16-week, multi-center, and single-arm trial-NCT00669864 which investigated the efficacy and safety of BIAsp30 ± Metformin in T2D patients inadequately controlled with basal insulin. Two subgroups of basal insulin treatment were categorized as insulin glargine (IGla) ± Metformin and neutral protamine hagedorn (NPH) insulin ± Metformin. The market retail prices of medications were calculated to estimate treatment costs. The diabetes management and complications costs were obtained from Chinese published data. An annual discounting rate of 3% was used for both costs and health outcomes. One-way sensitivities analysis was performed. **RESULTS:** Therapy conversion to BIAsp30 was projected to improve life expectancy significantly in comparison with IGla (0.347 ± 0.245 years), and NPH (0.452 ± 0.242 years). Transfer to BIAsp30 was associated with improvements in 0.327 quality-adjusted life-years (QALYs) over IGla, and 0.393 QALYs over NPH. Therapy conversion to BIAsp30 reduced medical costs by Chinese Yuan (CNY) 46,540 per patient compared to IGla. However, it increased CNY 19,525 compared to NPH and was associated with an incremental cost-effectiveness ratio of CNY 49,730 per QALY gained. **CONCLUSIONS:** Therapy conversion from basal insulin to BIAsp30 in T2D patients in China was associated with improvements in life expectancy and QALYs. Transfer to BIAsp30 was cost-saving treatment strategy in T2D patients managed with IGla, and would be considered cost-effective in T2D patients managed with NPH, given a willingness-to-pay threshold of CNY 75,375 per QALY (three times GDP per capita in 2009) gained in China.

DB2

TRANSLATION AND VALIDATION OF MICHIGAN DIABETES KNOWLEDGE SCALE INTO MALAYSIAN VERSION

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OBJECTIVES: To translate the Michigan Diabetes Knowledge Scale (MDKT) into the Malaysian language, and to examine the psychometric properties of the Malaysian version of the MDKT among patients with type 2 diabetes, including its validity and reliability. **METHODS:** After obtaining permission, a standard "forward-backward" translation procedure was used to create the Malaysian version of the MDKT from the original English version. A convenience sample of 307 outpatients with type 2 diabetes was identified between May and October, 2009. All data were collected from the Penang General Hospital, Penang, Malaysia. Instruments consisted of the Malaysian version of MDKT and a socio-demographic questionnaire. Medical records were reviewed for hemoglobin A1C (HbA1C) levels and other clinical data. Reliability was tested for internal consistency using Cronbach's α coefficient. Validity was confirmed using known group validity. **RESULTS:** Employing the recommended scoring method, the mean ± SD of MDKT scores was 7.88 ± 3.01. Good internal consistency was found, (`s $\alpha = 0.702$), the test–retest reliability value by using Spearman's rank correlation was 0.894 ($P < 0.001$). For known group validity, a significant relationship between MDKT categories and HbA1c categories ($\times 2 = 21.626$; $P \geq 0.001$) was found. **CONCLUSIONS:** The MDKT can be used for diabetes knowledge assessment in diabetes. The findings of this validation study indicate that the Malaysian version of the MDKT is a reliable and valid measure of medication adherence which can now be used in clinical and research practice.

DB3

LIFETIME CLINICAL PROJECTIONS FOR OVERWEIGHT OR OBESE SUBJECTS WITH IMPAIRED GLUCOSE INTOLERANCE BASED ON THE LONG TERM RESULTS OF THE DIABETES PREVENTION PROGRAM AND DIABETES PREVENTION PROGRAM OUTCOMES STUDY

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OBJECTIVES: Metformin and intensive lifestyle interventions (ILI) were shown to reduce incidence of type 2 diabetes (T2D) versus standard care in overweight or obese subjects with impaired glucose tolerance (IGT) in the Diabetes Prevention Program (DPP) trial and Diabetes Prevention Program Outcomes Study (DPPOS), a total follow-up of 10 years. Our aim was to project the lifetime clinical outcomes to be expected from T2D prevention in high-risk subjects treated with standard care, metformin or ILI, based on the results from the DPP + DPPOS. **METHODS:** A semi-Markov, second-order Monte Carlo model was developed to project the 10-year clinical results of the DPP + DPPOS to patient lifetimes. Specifically, we calculated years free of T2D, cumulative incidences of T2D, and nondiscounted life expectancies in subjects who were initiated on diabetes prevention regimens based on metformin, ILI or standard care. Four health states were modeled: normoglycemia (NG); IGT; T2D and dead. Subjects started in IGT and progressed to T2D or NG, at rates dependent on the treatment received. State-specific mortality rates for NG, IGT or T2D were used. Univariate and probabilistic sensitivity analyses were performed. **RESULTS:** For standard care, metformin or ILI, mean (standard deviation) number of years free of T2D were 9.47 (0.08), 11.98 (0.09), 15.17 (0.11) years respectively. Cumulative incidences of T2D were 89.7% (0.2), 83.7% (0.2) and 73.4% (0.3%) for standard care, metformin or ILI respectively. Mean life expectancies from baseline age of 50 years were 27.64 (0.14), 27.95 (0.12), 28.33 (0.11) years for standard care, metformin or ILI respectively. Results were most sensitive to the relative risk reduction in the incidence of T2D and relative risks of mortality in the T2D state versus IGT state. **CONCLUSIONS:** Substantial improvements in lifetime clinical outcomes can be expected in high risk subjects treated with metformin or ILI to delay or prevent the onset of T2D.

DB4

ECONOMIC EVALUATION OF THIAZOLIDINEDIONES AS ADD-ON THERAPY FOR TREATMENT OF TYPE 2 DIABETIC PATIENTS IN THE TAIWANESE NATIONAL HEALTH INSURANCE SYSTEM

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OBJECTIVES: The cost-effectiveness of adding thiazolidinediones (TZDs), rosiglitazone or pioglitazone, to metformin in treating type-2 diabetes mellitus was assessed from a Taiwanese national health insurance perspective. **METHODS:** This analysis was based on patient-level data extracted from the 2000–2005 Taiwan's National Health Insurance (NHI) databases. Type 2 diabetic patients who had their first ambulatory visits with a diagnosis of diabetes mellitus and had received consecutive metformin treatments between 2001 and 2005 were identified. Clinical effectiveness, a proxy of glycemic control (time to insulin dependence), and direct medical cost also were estimated from the NHI databases. Incremental cost-effectiveness ratio (ICER) was calculated and expressed as cost per delayed year to insulin dependence. **RESULTS:** The use of TZDs as add-on therapy compared non-TZDs add-on therapy was associated with a delay in time to insulin dependence, rosiglitazone was associated with an additional 151 days (0.41 years) and pioglitazone was associated with an additional 101 days (0.28 years) of delay in insulin dependence. During the follow-up period, total mean medical costs were higher in patients who received an add-on rosiglitazone (New Taiwan dollars (NT) 153,162) or pioglitazone (NT 139,931) compared to add-on non-TZDs (NT 113,492) and the additional medical costs were driven primarily by diabetic medication cost and outpatient visit costs. Combining the cost and effectiveness results, the ICER showed that the additional total medical costs of add-on rosiglitazone or pioglitazone were comparable, with ICERs of 95,874 and 95,485 NT dollars per year delay in insulin dependence, respectively. **CONCLUSIONS:** This analysis suggests that add-on rosiglitazone or pioglitazone improves glycemic control but also increases direct medical costs compared with add-on non-TZDs when used in type-2 diabetic patients. In terms of the incremental medical costs associated with these clinical benefits, add-on rosiglitazone or pioglitazone are similar in the National Health Insurance system in Taiwan.

PODIUM SESSION II: DATABASE STUDIES

DS1

ESTIMATING ADHERENCE AND PERSISTENCY OF ANTIDEPRESSANTS USING THE KOREA NATIONAL HEALTH INSURANCE CLAIMS DATABASE

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OBJECTIVES: To investigate adherence and persistence of antidepressants (ADs) among the patients with depression in Korea. **METHODS:** Using the Korean Health Insurance Review & Assessment Service (HIRA) claims database (2006–2008), patients aged 18–84 with at least one inpatient or two outpatient diagnoses of depres-